

REMARKS

Review and reconsideration of the Office Action dated March 3, 2005 is respectfully requested in view of the above amendments and the following remarks.

Applicants appreciate the Examiner's helpful suggestions for correcting formalities in the application.

The limitation from Claim 2, step (d), has been incorporated into paragraph [0021] of the specification.

Regarding antecedent basis for "raw vaned diffuser (casting)" in Claim 11, Applicants note that Claim 11 originally depended from Claims 1 and 9. Antecedent basis for this term in current Claim 11 (which depends from Claim 9 which depends from Claim 2) can be found in Claim 2, steps (e), (f), and (g) and Claim 9 which depends from Claim 2.

New Claim 13 depends from Claim 1, and defines the "hub" as part of the one piece casting without reciting "raw casting", thus avoids the antecedent basis problem.

Claim 14 parallels Claim 4 but depends from Claim 13 and refers to ribs disposed around the hub without referring to "raw casting". The hub contributes to economical manufacturability in that, as recited in paragraph [0022] of the specification:

- (a) the hub and ribs provide an improved flow path facilitating delivery of molten metal to the vane castings during casting;
- (b) ribs reduce ringing of the metal casting during machining by increasing the natural frequency of the casting;

(c) the hub provides for "single-chucking" (holding one appendage for the entire machining operation, a process which is much more economical than a process requiring re-chucking).

Regarding "hub" in Claim 11, it is correct that the "hub" was expressly recited only in reference to the male master in Claim 2, not the casting (end product) (though this would inherently have the shape of the master). Accordingly, Claim 11 has been amended to provide support for the "hub" in the casting.

Further, Claim 1 has been amended for clarity to recite that the vanes are "full" vanes. Although the term "full" is not expressly recited in the specification, it is clear from a reading of the specification that this was the intended meaning of "vanes". The invention concerns an economical method for manufacture of a diffuser disc with vanes. It would not be economical to form two discs, each with (half) vanes.

Multiple dependent Claims 3 and 9 have been amended to single dependency. Subject matter in these claims previously depending from Claim 1 has been removed to new Claims 12 and 13.

No new matter is introduced by these claim amendments.

Office Action

The paragraphing of the Examiner is adopted.

Paragraph 1 - Information Disclosure Statement

The Examiner advises that unless the references have been cited by the Examiner on form PTO-892, they have not been considered.

Applicants confirm that the references cited in the specification are merely representative of the state of the art over which the present invention improves, and are not believed to be otherwise relevant to the present invention.

Specification

The Examiner objects to the specification as failing to provide proper antecedent basis for the "molten non-ferrous metal or alloy having a melting point of less than about 700°C" recited in Claim 2, step (d).

The specification has been amended by incorporation into paragraph [0021] the language from Claim 2.

Claim Rejections - 35 USC §112

The Examiner states that there is insufficient antecedent basis for the limitations in Claim 11 as it recites the limitation "said raw vaned diffuser" in line 1, and "said hub" in line 3.

Regarding "raw vaned diffuser (casting)", Applicants point out that support could be found in Claim 2, steps (e), (f), and (g). However, it is correct that the "hub" was expressly recited only in reference to the male master, not the casting (though this inherently would have the shape of the master). Accordingly, Claim 11 has been amended to provide support for the hub in the casting.

No new matter is introduced by these amendments. Withdrawal of the rejection is respectfully requested.

Claim Rejections - 35 USC §102

The Examiner rejects Claim 1 under 35 U.S.C. 102(b) as being anticipated by Yu (US Patent No. 3,860,360).

Applicants respectfully traverse in view of the amendment of Claim 1 to recite that the casting includes full vanes. Although the term "full" is not expressly recited in the specification, it is clear from a reading of the specification that there is never any suggestion for partial vanes. The invention concerns an economical method for manufacture of a diffuser disc with vanes. It would not be economical to form two discs with vanes.

Yu addresses a problem in diffuser passages, and provides a passage transitioning smoothly from a rectangular inlet to a circular (or at least substantially elliptical) outlet (col. 5, line 45 and figures).

As pointed out by the Examiner, Yu, without going into any detail, mentions in passing at col. 1, line 64, on that "The manner in which the diffusing passages are manufactured is immaterial to the invention; they may be machined or may be cast, for instance."

However, Yu continues at the top of col. 2: "Preferably, each passage is formed half in the rear surface of the front plate and half in the front surface of the rear plate, these plates meeting along a joining plate 19."

The above follows necessarily from the design of the passages - a passage with a "circular (or at least substantially elliptical) outlet" cannot be formed in one piece by casting.

At best, two halves need to be cast, and these halves need to be matched **perfectly** in order to produce the passages of Yu.

It is not possible to form in one piece a diffuser plate with full vanes. In view of the citation of Yu, Applicants have amended Claim 1 for clarity to recite that the diffuser including full diffuser vanes (113) is cast as one piece in a plaster mold.

The present invention relates in substantial part to an economical method of manufacture (specification, paragraphs [0017] and [0018]). This is embodied in Claim 1. The diffuser, including full, delicate, critical vanes, is plaster cast in one part.

Applicants point out that Yu never specifically mentions plaster casting. Without specifically mentioning plaster casting - a laborious, time consuming and expensive process - those of ordinary skill reading the term "casting" in the Yu reference would presume that Yu was referring to conventional sand casting.

The Examiner should note that the architecture of the passageways of Yu is defined by a comparatively gross structure, wherein a generally rectangular passage transitions to a generally circular passage. Yu forms half of each passage on one surface. Such half-structures might economically be formed by sand casting.

In contrast, the present invention involves provision of diffuser vanes projecting from a disc surface. Diffuser vanes might be compared to airplane wings - foils with critical shapes. As discussed at paragraph [0019] of the specification, vaned diffusers (with refined shapes) have not, prior to the present invention, been manufactured by casting. Those of

ordinary skill in the art would have foreseen difficulties in producing the required high-quality surface finish, in achieving the close dimensional tolerances required, in successfully flowing the liquid material through the relatively long and thin vane casting channels, and in separating such a vaned diffuser from its cast without damage. These and other factors have mitigated against the use of casting, and particularly plaster casting, as a method to produce a vaned diffuser.

Thus, while sand casting per se is well known to be economical and suitable for producing structures including the gross structures as called for by Yu, the present invention is based in part on the discovery that the plaster casting technique, though more expensive considered alone, at the end of the day does provide savings in the manufacture of fine vane diffusers in that the plaster cast shapes tend to have a finer finish and do not require surface machining.

Finally, the mere mention in Yu of "casting" in general is not considered enabling, at least not for any fine structure as presently claimed.

Accordingly, withdrawal of the rejection of Claim 1 as anticipated by Yu is respectfully requested.

Claim Rejections - 35 USC §103

The Examiner rejects Claims 1, 3, and 11 under 35 U.S.C. 103(a) as being unpatentable over Yu in view of Galliger (US Patent No. 6,019,927).

For the reasons discussed above, Claims 1, 3 and 11 define an invention not obvious over the main reference or this combination of references.

U.S. Application No. 10/646,972
AMENDMENT A

Attorney Docket No.: DKT03002

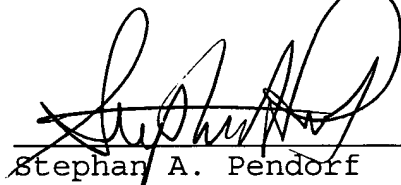
Allowable Subject Matter

Claims 2-11 are allowed.

Applicants amend the dependent claims to single dependency. Indication of allowance of Claims 1 and 12-13, in addition to Claims 2-11, is respectfully requested.

Favorable consideration and early issuance of the Notice of Allowance are respectfully requested. Should further issues remain prior to allowance, the Examiner is respectfully requested to contact the undersigned at the indicated telephone number.

Respectfully submitted,


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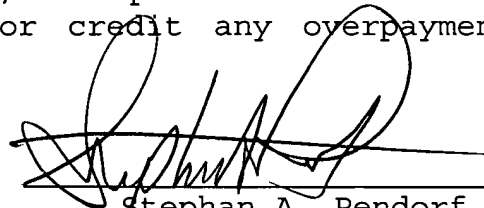
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Date: July 5, 2005

CERTIFICATE OF MAILING AND AUTHORIZATION TO CHARGE

I hereby certify that a copy of the foregoing AMENDMENT A for U.S. Application No. 10/646,972 filed August 22, 2003, was deposited in first class U.S. mail, with sufficient postage, addressed: Mail Stop: Amendment, Commissioner for Patents, P.O. Box 1450. Alexandria, VA 22313-1450, on July 5, 2005.

The Commissioner is hereby authorized to charge any additional fees that may be required at any time during the prosecution of this application, except for the issue fee, without specific authorization, or credit any overpayment, to Deposit Account No. 16-0877.


Stephan A. Pendorf